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U.S. Army Corps of Engineers
Project : Remedial Suite No. 3
Green River LD 3
30% Design Cost Estimate
Green River
Lock and Dam 3
Rochester, Kentucky

Time 13:15:45

Title Page

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Preparation Date 5/9/2011

Effective Date of Pricing 3/1/2016

Estimated Construction Time 520 Days

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Design Document 30% Design Document
Document Date 5/9/2011

District Louisville
Contact Jeffrey Esterle, PE, PG

Budget Year 2011
UOM System Original

Direct Costs
LaborCost
EQCost
MatlCost
SubBidCost

Timeline/Currency
Preparation Date 5/9/2011
Escalation Date 3/1/2016
Eff. Pricing Date 3/1/2016
Estimated Duration 520 Day(s)

Currency US dollars
Exchange Rate 1.000000

Costbook CB10EB: MII English Cost Book 2010

Labor KY100192: General Decision Number: KY100192 10/15/2010 KY192
Note: <http://www.wdol.gov> General Decision Number: KY100192 04/01/2011 KY192 State: Kentucky
Construction Type: Heavy Including Water and Sewer Line Construction. Counties: Ballard, Caldwell, Calloway, Carlisle, Crittenden, Fulton, Graves, Hickman, Hopkins, Livingston, Lyon, Marshall, McCracken, Muhlenberg, Ohio, Todd and Union Counties in Kentucky.
Labor Rates
LaborCost1
LaborCost2
LaborCost3
LaborCost4

Equipment EP09R02: MII Equipment Region 2 2009

02 MIDEAST	Fuel	Shipping Rates
Sales Tax 6.00	Electricity 0.094	Over 0 CWT 9.19
Working Hours per Year 1,450	Gas 2.960	Over 240 CWT 8.46
Labor Adjustment Factor 1.02	Diesel Off-Road 3.040	Over 300 CWT 7.61
Cost of Money 4.88	Diesel On-Road 3.590	Over 400 CWT 6.83
Cost of Money Discount 25.00		Over 500 CWT 4.13
Tire Recap Cost Factor 1.50		Over 700 CWT 4.13
Tire Recap Wear Factor 1.80		Over 800 CWT 6.14
Tire Repair Factor 0.15		
Equipment Cost Factor 1.00		
Standby Depreciation Factor 0.50		

<u>Date</u>	<u>Author</u>	<u>Note</u>
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3/23/2011	Erin Mattmiller	
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SUMMARY OF SCOPE OF WORK

This estimate outlines the costs (estimated at the 30% design phase) for the construction of a cellular dam, installation of a weir at the mill race channel, and dredging and pinning the gates at the lock. To create a uniform crest elevation, a new cellular concrete dam will be constructed upstream of the existing timber crib dam. The west end of the new dam will tie into the rock shelf. The new dam will extend across the upper lock approach, which eliminates the need for remediation of the upper gates or the lock chamber. A new abutment will be constructed at the east bank, upstream of the existing esplanade. In the mill race area, a concrete overflow weir will be constructed along the same alignment as the new cellular dam. The crest of the weir would be equal to the controlling elevation of the entry to the mill race, which is assumed to be a few feet lower than the crest elevation of the dam.

EFFECTIVE DATE OF PRICING AND ESCALATION:

The effective date of pricing is 3/1/2016 which corresponds to the midpoint of construction for Suite 3. All project items were escalated from 1/1/2010 to 3/1/2016. Items obtained from sources other than the 2010 Cost Book were first escalated to 1/1/2010 then escalated to 3/1/2016 with the 2010 Cost Book items.

JOB OFFICE OVERHEAD (JOOH)

The JOOH markups for the Prime Contractor and Subcontractor were calculated as running percentages of 6% and 10%, respectively per the direction from James J. Vermillion, CCC, Cost Engineer, USACE Louisville District, based on his experience with similar projects at the 30% design level. The markups can be adjusted if needed at later design levels and also if the contract acquisition is known for sure. A JOOH Direct Cost Report is provided to document the anticipated overhead items necessary to complete the project; however, the costs reported on the JOOH Direct Cost Report are not a part of the Contract or Project Cost.

ASSUMPTIONS:

1. The contractor can perform the work in two, 8-month construction seasons dating from May 2015 through December 2015 and May 2016 through December 2016 for an overall duration of 20 months. No work would be performed from January 2016 through April 2016.
2. The MATOC structure for contracting was used to build this estimate where the Prime Contractor administers the construction contract and the Sub Contractor performs all of the construction work.
3. Contingency and SIOH are calculated as flat rates of 25% and 8%, respectively, across the total project per the direction of James J. Vermillion, CCC, Cost Engineer, USACE Louisville District.
4. Kentucky State Sales Tax is applied to all material costs and rental costs for the USR equipment items consisting of the material transport barge, work barge, and 150-ton crawler crane. These items were not listed in the 2010 Cost Book so rental rates were obtained from the 2006 and 2008 RS Means Cost Data and escalated first to 2010, then to 2016 with the 2010 Cost Book items.
5. Labor rates were obtained from <http://www.wdol.gov> General Decision Number: KY100192 04/01/2011 KY192 State: Kentucky Construction Type: Heavy Including Water and Sewer Line Construction Counties: Ballard, Caldwell, Calloway, Carlisle, Crittenden, Fulton, Graves, Hickman, Hopkins, Livingston, Lyon, Marshall, McCracken, Muhlenberg, Ohio, Todd and Union Counties in Kentucky.
6. Costs for Planning, Engineering, and Design were calculated as 8% of the total Project Direct Cost for all items except for Planning, Engineering, and Design per the direction of James J. Vermillion, CCC, Cost Engineer, USACE Louisville District.

Date Author

Note

7. No acquisition of real estate is necessary for the project since all of the project area is owned by the United States of America.

8. Traffic control is minimal and the project area is closed to the public (no traffic).

9. All river and lock excavation will be accomplished by dredging with a barge-mounted crane and clamshell bucket.

10. The following bulking factors are used for estimating disposal volumes:

-Bulking for demolished concrete and excavated rock 1.50

-Bulking for demolished steel 2.00

-Bulking for excavated soils 1.30

-Bulking for demolished timber 2.00

11. The haul distance to the disposal site for all disposal materials is assumed as 15 miles round trip.

12. Stantec compared the cost for two mobilizations to the cost for one mobilization plus the rental fees over the 4-month break in construction for the following equipment: work barge, material transport barge, tugboat, 150-ton crawler crane, 100-ton crawler crane, backhoe, and front end loader. The less expensive option was to perform two mobilizations for all of the equipment listed above except for the barges and tugboat. Therefore, this estimate assumes that the rental cost over the break in construction will be paid for the barges and tugboat which will be mobilized only once and the two cranes, backhoe, and front end loader will be mobilized twice.

Direct Cost Markups		Category		Method			
Productivity		Productivity		Productivity			
Overtime		Overtime		Overtime			
	Days/Week		Hours/Shift		1st Shift	2nd Shift	3rd Shift
Standard	5.00		10.00	1.00	8.00	0.00	0.00
Actual	5.00		10.00	1.00	8.00	0.00	0.00

Day	OT Factor	Working	OT Percent	FCCM Percent
Monday	2.00	Yes	25.00	0.00
Tuesday	2.00	Yes		
Wednesday	2.00	Yes		
Thursday	2.00	Yes		
Friday	2.00	Yes		
Saturday	2.00	No		
Sunday	2.00	No		

Sales Tax	TaxAdj	Running % on Selected Costs
MatlCost		

Contractor Markups		Category		Method		
Prime JOOH		JOOH		Running %		
Sub JOOH		JOOH		Running %		
HOOH		HOOH		Running %		
Prime Profit		Profit		Profit Weighted Guidelines		
Guideline			Value		Weight	Percentage
Risk			0.040		20	0.80
Difficulty			0.040		15	0.60
Size			0.030		15	0.45
Period			0.030		15	0.45
Invest (Contractor's)			0.030		5	0.15
Assist (Assistance by)			0.030		5	0.15
SubContracting			0.120		25	3.00
Total					100	5.60

Sub Profit		Profit		Profit Weighted Guidelines		
Guideline			Value		Weight	Percentage
Risk			0.100		20	2.00
Difficulty			0.100		15	1.50
Size			0.030		15	0.45
Period			0.120		15	1.80
Invest (Contractor's)			0.080		5	0.40
Assist (Assistance by)			0.110		5	0.55
SubContracting			0.030		25	0.75
Total					100	7.45

Bond	Bond	Running %
Excise Tax	Excise	Running %

Owner Markups	Category	Method
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Escalation	<i>StartDate</i> 1/1/2010	Escalation <i>StartIndex</i> 720.27	<i>EndDate</i> 3/1/2016	Escalation	<i>EndIndex</i> 791.90	<i>Escalation</i> 9.94
Contingency SIOH		Contingency SIOH		Running % Running %		

Project Cost Summary Report		Description	Quantity	UOM	ContractCost	Escalation	Contingency	SIOH	ProjectCost
					14,475,025	1,438,818	3,978,461	1,591,384	21,483,688
					12,862,245.74				19,090,016.51
Dams			1.00	EA	12,862,246	1,278,507	3,535,188	1,414,075	19,090,017
					12,844,432.91				19,063,578.88
Main Dam			1.00	EA	12,844,433	1,276,737	3,530,292	1,412,117	19,063,579
					12,844,432.91				19,063,578.88
Cellular Dam			1.00	EA	12,844,433	1,276,737	3,530,292	1,412,117	19,063,579
					80,770.86				119,879.31
Derrick Stone			1.00	EA	80,771	8,029	22,200	8,880	119,879
					89.75	9.94%	27.49%	10.99%	133.20
Derrick Stone Placement			900.00	TON	80,771	8,029	22,200	8,880	119,879
		(Note: The USR CSI Task for derrick stone was built by determining material costs, estimating a production rate, and creating a USR crew of equipment and laborers. Material cost from Greenville Quarries, Contact is John Stovall (270) 338-2300. \$48/ton for derrick stone delivered by truck to site, includes unloading time for delivery and truck driver. Production rate of 100 tons/hour derived by calculating the total time for placement of 900 tons of derrick stone. The calculation of the total time to place all of the derrick stone accounted for the time to complete the following tasks: -unload the rock from the delivery truck; -load the rock onto the material transport barge; -travel time for the barge; -unload the rock from the barge; and -placement of the derrick stone. The production rate was calculated by dividing 900 tons by the total time to place 900 tons (9 hours) which equals 100 tons/hour. The quantity for derrick stone was calculated by determining the area of placement from the cross section and multiplying by the length of rock placement along the cell dam to get the volume of stone in cubic yards. A unit weight of 110 lb/cubic foot that accounts for porosity was used to convert from cubic yards of stone to tons.)							
					2,841,927.62				4,217,960.56
Dredging			1.00	EA	2,841,928	282,488	781,104	312,442	4,217,961
					20.04	9.94%	27.48%	10.99%	29.75
Mechanical dredging, 20 miles, barge mounted clamshell excavation into scows, dumped at sea, minimum			38,000.00	BCY	761,615	75,704	209,330	83,732	1,130,381
		(Note: Main Cells & Arc Cells = 28,980 BCY West Closure Cell = 247 BCY East Abutment Cell = 2,550 BCY, Training Wall Cell = 5,704 BCY The dredging volume for the main and arc cells was calculated using the average end area method. Dredging areas were calculated from existing and proposed cross sections in AutoCAD. Dredging for the West Closure, East Abutment and training wall cells was calculated by multiplying the plan area of the cells by the height from rock elevation to the existing sediment elevation. The cells were divided into segments to account for the variation in rock elevation across the cells and the volume of dredging for each segment was added to get the total dredging volume.)							
					41.61	9.94%	27.49%	10.99%	61.75
Spoil Disposal			50,000.00	LCY	2,080,313	206,783	571,774	228,710	3,087,580
		(Note: Spoil Disposal Volume = Total Dredging Volume x 1.30 (bulking factor for excavated soils).)							
					81,901.69				121,557.67
Cell Templates			1.00	EA	81,902	8,141	22,511	9,004	121,558
					3,091.45	9.94%	27.49%	10.99%	4,588.30
Open web bar joist, K Series, 40-ton job lots, spans up to 30', shop fabricated, incl shop primer, horizontal bridging, maximum			20.00	TON	61,829	6,146	16,994	6,797	91,766
		(Note: This item covers the construction of the Main Cell Template. Main Cell Template is based on the template used at KY River L&D3. The template consisted of set of steel trusses weighing 17 tons. Assume the template here would weigh approximately 20 tons.)							
					20,072.62	9.94%	27.49%	10.99%	29,791.58
Arc Cell Template			1.00	EA	20,073	1,995	5,517	2,207	29,792
		(Note: Arc Cell Template is based on the template used at KY River L&D3. The template consisted of a construction of various steel sections. The quantities and sections used here would be similar, although some substitutions have been made to avoid using sections not found in the Unit Price Book. The assembly for this item includes the following items from the 2010 Cost Book: (1) 05 12 23 75 1580 Structural steel member, 100-ton project, 1 to 2 story building, W12x58, A992 steel, shop fabricated, incl shop primer, bolted connections, 150 LF and (2) 05 12 23 75 0100 Structural steel member,							

Description	Quantity	UOM	ContractCost	Escalation	Contingency	SIOH	ProjectCost
100-ton project, 1 to 2 story building, W6x9, A992 steel, shop fabricated, incl shop primer, bolted connections, 70 LF.)			3,698,301.20				5,488,981.66
Sheet Piling	1.00	EA	3,698,301	367,611	1,016,478	406,591	5,488,982
			63.83	9.94%	27.48%	10.99%	94.74
PS27.5 Sheet Piling	34,000.00	SF	2,170,207	215,719	596,482	238,593	3,221,000
(Note: The USR CSI Task for this item was built by determining material costs, estimating a production rate, and creating a USR crew of equipment and laborers. Material Quote from L. B. Foster - Matt O'Kray (Oak Brook, IL office) 800-253-5050 x119 = \$0.80 per LB delivered for PS27.5 Sheet Piling. Material quote from Skyline Steel - Alex Grainger (West Chester, OH office - 513-777-7039) = \$0.98 per LB delivered for PS27.5 sheet piling. Average of two prices equals \$0.89/LB x 27.5 LB/SF (LB/SF from Skyline) = \$24.48/SF. Production rate estimated from Stantec's experience at KY River L&D3 with constructing a cell dam. Production rate was 5 days/main cell and the average square footage of piling per main cell was 3,430 SF/main cell which is equivalent to 68.6 SF/HR. The equipment for the sheet piling crew consists of 2 cranes, 2 barges, 1 tugboat, and 1 pile hammer. The laborers for the sheet piling crew consists of 2 heavy equipment operators for the cranes, 1 foreman (part time), 2 pile drivers, 1 oiler, and 1 medium equipment operator for the tug boat. The area of sheet piling was calculated for each cell by multiplying the number of sheet piles per cell by the width of each sheet pile by the average height from the crest to the top of rock elevation across the cell. The total area of sheet piling was calculated by adding up the area of sheet piling for each cell.)							
			54.07	9.94%	27.49%	10.99%	80.25
PZ22 Sheet Piling West Closure Cell	2,400.00	SF	129,764	12,899	35,666	14,266	192,594
(Note: The USR CSI Task for this item was built by determining material costs, estimating a production rate, and creating a USR crew of equipment and laborers. Material Quote from Skyline Steel - Alex Grainger (West Chester, OH office - 513-777-7039) = \$0.83 per LB x 22 LB/SF (Skyline) = \$18.26/SF delivered for PZ22 sheet piling for piles <=50 ft in length. Production rate estimated from Stantec's experience at KY River L&D3 with constructing a cell dam. Production rate was 5 days/main cell and the average square footage of piling per main cell was 3,430 SF/main cell. The equipment for the sheet piling crew consists of 2 cranes, 2 barges, 1 tugboat, and 1 pile hammer. The laborers for the sheet piling crew consists of 2 heavy equipment operators for the cranes, 1 foreman (part time), 2 pile drivers, 1 oiler, and 1 medium equipment operator for the tug boat. The quantity of sheet piling was calculated for this cell by dividing the cell into segments and multiplying the length of sheet piling by the average height from the rock elevation to the crest across the segment to get the area of sheet piling for that segment. The total area of sheet piling was calculated by adding the area of sheet piling for each segment.)							
			55.10	9.94%	27.49%	10.99%	81.78
PZ22 Sheet Piling Cutoff Wall	3,700.00	SF	203,885	20,266	56,038	22,415	302,604
(Note: The USR CSI Task for this item was built by determining material costs, estimating a production rate, and creating a USR crew of equipment and laborers. Material Quote from Skyline Steel - Alex Grainger (West Chester, OH office - 513-777-7039) = \$0.86 per LB x 22 LB/SF (Skyline) = \$18.92/SF delivered for PZ22 sheet piling for piles 50-70 ft in length. Production rate estimated from Stantec's experience at KY River L&D3 with constructing a cell dam. Production rate was 5 days/main cell and the average square footage of piling per main cell was 3,430 SF/main cell. The equipment for the sheet piling crew consists of 2 cranes, 2 barges, 1 tugboat, and 1 pile hammer. The laborers for the sheet piling crew consists of 2 heavy equipment operators for the cranes, 1 foreman (part time), 2 pile drivers, 1 oiler, and 1 medium equipment operator for the tug boat. The quantity of sheet piling was calculated for this cell by dividing the cell into segments and multiplying the length of sheet piling by the average height from the rock elevation to the crest across the segment to get the area of sheet piling for that segment. The total area of sheet piling was calculated by adding the area of sheet piling for each segment.)							
			71.00	9.94%	27.49%	10.99%	105.38
PZ35 East Abutment Cell	7,000.00	SF	497,011	49,403	136,603	54,641	737,659
(Note: The USR CSI Task for this item was built by determining material costs, estimating a production rate, and creating a USR crew of equipment and laborers. Material Quote from Skyline Steel - Alex Grainger (West Chester, OH office - 513-777-7039) = \$0.83 per LB x 35 LB/SF (Skyline) = \$29.05/SF delivered for PZ35 sheet piling for piles 50-55 ft in length. Production rate estimated from Stantec's experience at KY River L&D3 with constructing a cell dam. Production rate was 5 days/main cell and the average square footage of piling per main cell was 3,430 SF/main cell. The equipment for the sheet piling crew consists of 2 cranes, 2 barges, 1 tugboat, and 1 pile hammer. The laborers for the sheet piling crew consists of 2 heavy equipment operators for the cranes, 1 foreman (part time), 2 pile drivers, 1 oiler, and 1 medium equipment operator for the tug boat. The quantity of sheet piling was calculated for this cell by dividing the cell into segments and multiplying the length of sheet piling by the average height from the rock elevation to the crest across the segment to get the area of sheet piling for that segment. The total area of sheet piling was calculated by adding the area of sheet piling for each segment.)							
			72.65	9.94%	27.48%	10.99%	107.83
PZ35 Training Wall Cell	9,600.00	SF	697,434	69,325	191,690	76,676	1,035,125
(Note: The USR CSI Task for this item was built by determining material costs, estimating a production rate, and creating a USR crew of equipment and laborers. Material Quote from Skyline Steel - Alex Grainger (West Chester, OH office - 513-777-7039) = \$0.86 per LB x 35 LB/SF (Skyline) = \$30.10/SF delivered for PZ35 sheet piling for piles 55-70 ft in length. Production rate estimated from Stantec's experience at KY River L&D3 with constructing a cell dam. Production rate was 5 days/main cell and the average square footage of piling per main cell was 3,430 SF/main cell. The equipment for the sheet piling crew consists of 2 cranes, 2 barges, 1 tugboat, and 1 pile hammer. The laborers for the sheet piling crew consists of 2 heavy equipment operators for the cranes, 1 foreman (part time), 2 pile							

Description	Quantity	UOM	ContractCost	Escalation	Contingency	SIOH	ProjectCost
drivers, 1 oiler, and 1 medium equipment operator for the tug boat. The quantity of sheet piling was calculated for this cell by multiplying the cell perimeter by the height from the top of piling elevation to the top of rock elevation corresponding to TOR at Boring 19.)							
			68,664.05				101,910.50
Dewatering	1.00	EA	68,664	6,825	18,872	7,549	101,911
			1,144.40	9.94%	27.48%	10.99%	1,698.51
Dewatering, pumping, 8 hr., attended 8 hours per day, 3" centrifugal pump, includes 20 L.F. of suction hose and 100 L.F. of discharge hose	60.00	DAY	68,664	6,825	18,872	7,549	101,911
(Note: The quantity for dewatering was calculated using the production rates for sheet piling and concrete.)							
			740,432.08				1,098,941.89
Clean Bottom of Cells	1.00	EA	740,432	73,599	203,508	81,403	1,098,942
			46.28	9.94%	27.48%	10.99%	68.68
Clean Bottom of Cells	16,000.00	SF	740,432	73,599	203,508	81,403	1,098,942
(Note: The USR CSI Task for this item was built by estimating a production rate and creating a USR crew of equipment and laborers. The production rate of 35 SF/hour is based on Stantec's experience at KY River L&D3 with constructing a cell dam. The equipment for the crew for this item consists of 1 air compressor, 1 air hose, and 1 15-ton crawler crane. The laborers for the crew consist of 1 heavy equipment operator for the crane, 1 oiler, 1 light equipment operator, 3 laborers, 1 foreman, and 4 divers. Labor costs for the dive crew were obtained from Adam Crace at Stantec 859-433-3084 on March 30, 2011. The labor cost for a 4 man dive crew is \$2,800/day. Assume 10 hour days and that is equivalent to \$70/HR/diver. The quantity for this item corresponds to the surface area of the cell dam.)							
			4,201,076.79				6,235,196.16
Tremie Concrete	1.00	EA	4,201,077	417,587	1,154,666	461,866	6,235,196
			210.05	9.94%	27.48%	10.99%	311.76
Tremie Concrete Placement	20,000.00	CY	4,201,077	417,587	1,154,666	461,866	6,235,196
(Note: The USR CSI Task for this item was built by determining material costs, estimating a production rate, and creating a USR crew of equipment and laborers. Material cost from quote from Bill Hazelwood at imi concrete 270-831-0950 on 3/30/2011. Quote #11737. Tremie Concrete = \$118.50/CY (mixed and delivered to the site). Add \$1.05 per CY for Environmental and Energy Charges per direction from quote. So total material price/CY is \$119.55/CY. Production rate is 100 CY/Hour based on experience at the KY River L&D3 cell dam. The equipment for the crew for this task consists of 1 concrete pump, 2 cranes, 2 barges, 1 tug boat, and 1 front-end loader. The laborers for this crew consist of 5 semi-skilled laborers, 1 oiler, 1 medium equipment operator for the tug boat, 1 foreman, and 2 heavy equipment operators for the cranes. The volume of tremie concrete was calculated by multiplying the plan area of the cell dam by the height from rock elevation to the bottom elevation of the concrete cap. The cell dam was divided into segments to account for the variation in rock elevation across the cell dam and the volume of concrete for each segment was added to get the total volume of concrete.)							
			377,979.27				560,993.06
Reinforced Concrete	1.00	EA	377,979	37,571	103,888	41,555	560,993
			2,867.31	9.94%	27.49%	10.99%	4,255.64
Reinforcing Steel, in place, slab on grade, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	15.00	TON	43,010	4,275	11,821	4,728	63,835
(Note: Per RS Means 03 21 10 60 1050, added 10% to the material cost since the quantity is between 10 and 50 tons. The quantity of steel reinforcement was calculated by first deriving the total reinforcement in lb/SF (plan area). This derivation assumes rebar (No. 3 bars) will be placed on 1-foot spacing each way for two horizontal mats and 4-foot dowels will be placed on 3-foot spacing. The reinforcement in lb/SF was then multiplied by the plan area of the cell caps.)							
			1.21	9.94%	27.49%	10.99%	1.80
Concrete finishing, floors, basic finishing for unspecified flatwork, bull float, manual float & broom finish, includes edging and joints, excludes placing, striking off & consolidating	16,000.00	SF	19,357	1,924	5,320	2,128	28,729
(Note: The quantity for this item corresponds to the surface area of the cell caps.)							
			166.11	9.94%	27.48%	10.99%	246.54
Conventional Concrete Placement	1,900.00	CY	315,613	31,372	86,746	34,698	468,430
(Note: The USR CSI Task for this item was built by determining material costs, estimating a production rate, and creating a USR crew of equipment and laborers. Material cost from quote from Bill Hazelwood at imi concrete 270-831-0950 on 3/30/2011. Quote #11737. Conventtional Concrete = \$90.50/CY (mixed and delivered to the site). Add \$1.05 per CY for Environmental and Energy Charges							

Green River LD 3

Project Cost Summary Report Page 4

Description	Quantity	UOM	ContractCost	Escalation	Contingency	SIOH	ProjectCost
per direction from quote. So total price/CY is \$91.55/CY. Production rate of 100 CY/HR based on experience at KY L&D3 cell dam. The equipment for the crew for this task consists of 1 concrete pump, 2 cranes, 2 barges, 1 tug boat, and 1 front-end loader. The laborers for this crew consist of 5 semi-skilled laborers, 1 oiler, 1 medium equipment operator for the tug boat, 1 foreman, and 2 heavy equipment operators for the cranes. The volume of conventional concrete corresponds to the volume of the concrete cap.)							
Bracing	1.00	EA	481,803	47,891	132,424	52,969	715,088
(Note: Bracing is based on that used at KY River L&D3. The bracing consisted of heavy steel sections. The sections used here are similar, although some adjustments have been made to avoid using sections not found in the Unit Price Book. The quantities for each section used have been adapted for the geometry of the cells at Green River L&D3.)							
Structural steel member, 100-ton project, 1 to 2 story building, W24x117, A992 steel, shop fabricated, incl shop primer, bolted connections	1,400.00	LF	325,861	32,391	89,563	35,825	483,640
Structural steel member, 100-ton project, 1 to 2 story building, W18x76, A992 steel, shop fabricated, incl shop primer, bolted connections	1,000.00	LF	155,942	15,501	42,861	17,144	231,448
New Guard Railing	1.00	EA	5,863	583	1,611	645	8,701
Railing, pipe, steel, primed, 2 rails, 3'-6" high, posts @ 5' O.C., 1-1/2" dia, shop fabricated	100.00	LF	5,863	583	1,611	645	8,701
QC Borings	1.00	EA	110,984	11,032	30,504	12,202	164,721
Subsurface investigation, boring and exploratory drilling, drilling in rock, "NX" core, with casing and sampling, includes bit, layout and set up	850.00	LF	101,110	10,050	27,790	11,116	150,067
(Note: Total of 20 borings. The length of boring corresponds to the average piling depth for the corresponding cell plus an additional 5 feet.)							
Subsurface investigation, boring and exploratory drilling, mobilization and demobilization, minimum	10.00	LS	9,874	981	2,714	1,085	14,654
(Note: Total of 20 borings. Assume 2 borings/mobilization and demobilization)							
Site Restoration	1.00	EA	151,930	15,102	41,758	16,703	225,492
Backfill, structural, common earth, 300 H.P. dozer, 150' haul	2,450.00	LCY	3,314	329	911	364	4,918
(Note: This item covers earth backfill at the east end of the cellular dam. Assume that half of the total backfill consists of earth backfill.)							
Steel sheet piling seawalls, crushed stone, placed behind bulkhead by clam bucket	2,450.00	LCY	141,696	14,085	38,945	15,578	210,303
(Note: This item covers gravel backfill at east end of cellular dam. Assume that half of the total backfill consists of gravel backfill.)							
Compaction, 4 passes, 6" lifts, riding, sheepsfoot or wobbly wheel roller	2,750.00	ECY	4,223	420	1,161	464	6,268
(Note: The quantity for compaction corresponds to the volume of earth backfill divided by 0.9 to account for compaction.)							
Fine grading, slopes, gentle, finish grading	2,950.00	SY	643	64	177	71	955
(Note: The quantity for grading is equal to the clearing and grubbing area.)							
Seeding, mechanical seeding hydro or air seeding for large areas, includes lime, fertilizer and seed	2,950.00	SY	2,053	204	564	226	3,047

Description	Quantity	UOM	ContractCost	Escalation	Contingency	SIOH	ProjectCost
(Note: The quantity for seeding is equal to the clearing and grubbing area.)							
Restore Portion of County Road 1273 as Gravel Road	1.00	EA	2,799.95 2,800	278	770	308	4,155.65 4,156
(Note: This item covers restoration for a 140-foot-long and 15-foot-wide section of County Road 1273.)							
Temporary, roads, gravel fill, 4" gravel depth, excl surfacing	240.00	SY	11.67 2,800	9.94% 278	27.48% 770	10.99% 308	17.32 4,156
Spillway	1.00	EA	17,812.83 17,813	1,771	4,896	1,958	26,437.63 26,438
Diversion of Water	1.00	EA	6,973.58 6,974	693	1,917	767	10,350.12 10,350
Dewatering, pumping, 8 hr., attended 8 hours per day, 3" centrifugal pump, includes 20 L.F. of suction hose and 100 L.F. of discharge hose	5.00	DAY	1,144.40 5,722	9.94% 569	27.48% 1,573	10.99% 629	1,698.51 8,493
(Note: The quantity for dewatering is based on the assumption that it will take 5 days to construct the weir.)							
Sandbags, 14" x 26"	750.00	EA	1.67 1,252	9.94% 124	27.49% 344	10.99% 138	2.48 1,858
(Note: The sandbags will be used to build a small cofferdam for water diversion. The 2010 Cost Book item 31 25 13 10 1401 provides material costs for sandbags. A USR Sandbag crew was added to this item to provide labor costs. The crew consists of 2 laborers and the production rate is based on the assumption that the crew can place 5 sandbags/minute.)							
Rock Excavation	1.00	EA	1,272.08 1,272	126	350	140	1,888.01 1,888
Rock excavation, dense rock, with air hammer	10.00	BCY	53.51 535	9.94% 53	27.49% 147	10.99% 59	79.42 794
(Note: The rock excavation quantity was calculated based on the assumption that 6 inches of rock will be excavated over the footprint of the weir to clean the rock surface.)							
Selective demolition, disposal only, urban buildings with salvage value allowed, concrete frame, includes loading and 5 mile haul to dump	15.00	CY	49.13 737	9.94% 73	27.48% 203	10.99% 81	72.92 1,094
(Note: This item covers the disposal of excavated rock. Multiply labor (4.81) and equipment costs (4.25) by a factor of 3 since we assume a 15 mile haul to dump.)							
Reinforced Concrete	1.00	EA	9,567.17 9,567	951	2,630	1,052	14,199.50 14,199
Reinforcing Steel, in place, slab on grade, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	1.00	TON	2,867.31 2,867	9.94% 285	27.49% 788	10.99% 315	4,255.64 4,256
(Note: Per RS Means 03 21 10 60 1050, added 10% to the material cost since the quantity is between 10 and 50 tons. The quantity of steel reinforcement was calculated by first deriving the total reinforcement in lb/SF (plan area). This derivation assumes rebar (No. 3 bars) will be placed on 1-foot spacing each way for two horizontal mats and 4-foot dowels will be placed on 3-foot spacing. The reinforcement in lb/SF was then multiplied by the plan area of the weir.)							
Conventional Concrete Placement	40.00	CY	166.11 6,644	9.94% 660	27.49% 1,826	10.99% 730	246.54 9,862
(Note: The USR CSI Task for this item was built by determining material costs, estimating a production rate, and creating a USR crew of equipment and laborers. Material cost from quote from Bill Hazelwood at imi concrete 270-831-0950 on 3/30/2011. Quote #11737. Conventional Concrete = \$90.50/CY (mixed and delivered to the site). Add \$1.05 per CY for Environmental and Energy Charges per direction from quote. So total price/CY is \$91.55/CY. Production rate of 100 CY/HR based on experience at KY L&D3 cell dam. The equipment for the crew for this task consists of 1 concrete pump, 2 cranes, 2 barges, 1 tug boat, and 1 front-end loader. The laborers for this crew consist of 5 semi-skilled laborers, 1 oiler, 1 medium equipment operator for the tug boat, 1 foreman, and 2 heavy equipment operators for the cranes. The volume of conventional concrete corresponds to the volume of the weir.)							

Description	Quantity	UOM	ContractCost	Escalation	Contingency	SIOH	ProjectCost
C.I.P. concrete forms, bulkhead for slab on grade w/ keyway, 4-1/2" high, exp metal, includes erecting, bracing, stripping and cleaning	10.00	LF	5.54 55	9.94% 6	27.49% 15	10.99% 6	8.22 82
Locks	1.00	EA	736,199.92 736,200	73,178	202,345	80,938	1,092,660.56 1,092,661
Demolish Railing Parallel to Land Lock Wall	1.00	EA	1,848.16 1,848	184	508	203	2,743.03 2,743
Selective demolition, misc metal fences & gates, metal tubular picket fences, 4'-6' high	320.00	LF	3.82 1,223	9.94% 122	27.49% 336	10.99% 134	5.67 1,815
Selective demolition, disposal only, urban buildings with salvage value allowed, steel frame, includes loading and 5 mile haul to dump (Note: Increase bare cost by a factor of 3.0 since a 15-mile haul to dump is assumed for the project. Disposal Volume = 2 x Volume of posts and rails to account for bulking.)	15.00	CY	41.70 625	9.94% 62	27.48% 172	10.99% 69	61.89 928
Replace Railing Parallel to Land Lock Wall	1.00	EA	18,760.79 18,761	1,865	5,156	2,063	27,844.57 27,845
Railing, pipe, steel, primed, 2 rails, 3'-6" high, posts @ 5' O.C., 1-1/2" dia, shop fabricated	320.00	LF	58.63 18,761	9.94% 1,865	27.49% 5,156	10.99% 2,063	87.01 27,845
Demolish Upper Guard and Upper Guide Walls	1.00	EA	528,870.48 528,870	52,570	145,360	58,144	784,944.27 784,944
Selective demolition, retaining walls, concrete retaining wall, 10' high, excludes reinforcing (Note: Multiply Labor and Equip costs by factor of 1.2 since concrete portion of wall is 12' high. Quantity corresponds to length of upper guard wall and upper guide wall to be demolished.)	230.00	LF	538.32 123,814	9.94% 12,307	27.49% 34,030	10.99% 13,612	798.97 183,763
Selective demolition, disposal only, urban buildings with salvage value allowed, concrete frame, includes loading and 5 mile haul to dump (Note: This item covers the disposal of demolished concrete. Multiply labor (4.81) and equipment costs (4.25) by a factor of 3 since we assume a 15 mile haul to dump. Disposal Volume = Demolition Volume x 1.5 to account for bulking.)	1,100.00	CY	49.13 54,046	9.94% 5,372	27.48% 14,855	10.99% 5,942	72.92 80,214
Building demolition, small buildings or single buildings, wood, elevated slabs, includes 20 mile haul, excludes salvage, foundation demolition or dump fees (Note: The quantity corresponds to the volume of the timber portion of the guard and guide walls to be demolished.)	60,000.00	CF	0.40 24,237	9.94% 2,409	27.49% 6,662	10.99% 2,665	0.60 35,972
Selective demolition, disposal only, urban buildings with salvage value allowed, wood frame, includes loading and 5 mile haul to dump (Note: This item covers the disposal of demolished timber. Multiply labor (7.11) and equipment costs (6.28) by a factor of 3 since we assume a 15 mile haul to dump. Timber Disposal = Volume of timber demolision x 2.0 to account for bulking.)	4,500.00	CY	72.62 326,774	9.94% 32,481	27.48% 89,814	10.99% 35,926	107.78 484,995
Safety Signage	1.00	EA	262.05 262	26	72	29	388.93 389
Safety signs (yellow and magenta), aluminum/acrylic, 10" x 14"	6.00	EA	43.67 262	9.94% 26	27.48% 72	10.99% 29	64.82 389
			155,674.32				231,050.27

Description	Quantity	UOM	ContractCost	Escalation	Contingency	SIOH	ProjectCost
Dredging to Open Gates	1.00	EA	155,674	15,474	42,787	17,115	231,050
Mechanical dredging, 20 miles, barge mounted clamshell excavation into scows, dumped at sea, minimum	2,100.00	BCY	42,089	4,184	11,568	4,627	62,468
(Note: The dredging volume to open the lock gates was calculated by multiplying the dredging area by the height from the gate sill elevation to the existing sediment elevation. The dredging area was divided into segments to account for the variation in the top of sediment elevation across the lock and the volume of dredging for each segment was added to get the total dredging volume.)							
Spoil Disposal	2,730.00	LCY	113,585	11,290	31,219	12,488	168,582
(Note: Spoil Disposal Volume = Total Dredging Volume x 1.30 (bulking factor for excavated soils).)							
Pin Lower Gates Open	1.00	EA	14,307	1,422	3,932	1,573	21,234
(Note: The tie-back consist of a W section, a thin steel plate, and an anchor rod. The W-section size was assumed to be a W8x58 section based on similar designs at Kentucky River Lock No. 5, 6, & 7. Since this size was unavailable in 2010 RS Means, the larger W12x58 was chosen. The extra material and cost of the W12x58 was assumed to account for the steel required for the steel plate and anchor rod. Due to limited design drawings, the actual geometry of the lock gates and stiffeners is unknown. Therefore, the length of the weld between the W section and the gate stiffener was assumed to be 6 linear feet per W section.)							
Structural steel member, 100-ton project, 1 to 2 story building, W12x58, A992 steel, shop fabricated, incl shop primer, bolted connections	70.00	LF	8,396	835	2,308	923	12,462
Welding structural steel in field, single pass, 0.4 Lb/LF, 5/16" thick, continuous fillet, type 6011	50.00	LF	1,453	144	399	160	2,156
Welding structural steel in field, cleaning & welding plates/bars/rods to existing beams/columns/trusses	50.00	LF	4,457	443	1,225	490	6,616
Restore Concrete Esplanade	1.00	EA	16,477	1,638	4,529	1,812	24,456
(Note: Total area of esplanade is 867 SY. Assume 50% of esplanade will need restoration.)							
Concrete paving surface treatment, 4500 psi, fixed form, unreinforced, 12' pass, 6" thick, includes joints, finishing, and curing	450.00	SY	16,477	1,638	4,529	1,812	24,456
(Note: Total area of esplanade is 867 SY. Assume 50% of esplanade will need restoration.)							
Planning, Engineering and Design	1.00	EA	876,580	87,132	240,928	96,371	1,301,011
(Note: Costs based on 8% of Project Direct Cost per James J. Vermillion, CCC, Cost Engineer, USACE Louisville District.)							
Planning, Engineering, & Design	1.00	LS	876,580	87,132	240,928	96,371	1,301,011
(Note: Costs based on 8% of Project Direct Cost per James J. Vermillion, CCC, Cost Engineer, USACE Louisville District. Used 8% of \$9,184,928 which corresponds to the total project direct costs for all items except for Planning, Engineering, & Design.)							

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost
Contract Cost Summary Report				9,919,723	2,214,004	12,133,727	2,341,299	14,475,025
04 Dams	1.00	EA	Sub	8,687,669.16 8,687,669		10,781,810.09 10,781,810		12,862,245.74 12,862,246
0401 Main Dam	1.00	EA	Sub	8,675,637.67 8,675,638		10,766,878.44 10,766,878		12,844,432.91 12,844,433
Cellular Dam	1.00	EA	Sub	8,675,637.67 8,675,638		10,766,878.44 10,766,878		12,844,432.91 12,844,433
Derrick Stone	1.00	EA	Sub	54,555.83 54,556		67,706.38 67,706		80,770.86 80,771
USR USR Derrick Stone Placement	900.00	TON	Sub	60.62 54,556	13,151	75.23 67,706	13,064	89.75 80,771
(Note: The USR CSI Task for derrick stone was built by determining material costs, estimating a production rate, and creating a USR crew of equipment and laborers. Material cost from Greenville Quarries, Contact is John Stovall (270) 338-2300. \$48/ton for derrick stone delivered by truck to site, includes unloading time for delivery and truck driver. Production rate of 100 tons/hour derived by calculating the total time for placement of 900 tons of derrick stone. The calculation of the total time to place all of the derrick stone accounted for the time to complete the following tasks: -unload the rock from the delivery truck; -load the rock onto the material transport barge; -travel time for the barge; -unload the rock from the barge; and -placement of the derrick stone. The production rate was calculated by dividing 900 tons by the total time to place 900 tons (9 hours) which equals 100 tons/hour. The quantity for derrick stone was calculated by determining the area of placement from the cross section and multiplying by the length of rock placement along the cell dam to get the volume of stone in cubic yards. A unit weight of 110 lb/cubic foot that accounts for porosity was used to convert from cubic yards of stone to tons.)								
Dredging	1.00	EA	Sub	1,919,550.24 1,919,550	462,703	2,382,253.03 2,382,253	459,675	2,841,927.62 2,841,928
RSM 352023130310 Mechanical dredging, 20 miles, barge mounted clamshell excavation into scows, dumped at sea, minimum	38,000.00	BCY	Sub	13.54 514,425	124,001	16.80 638,425	123,189	20.04 761,615
(Note: Main Cells & Arc Cells = 28,980 BCY West Closure Cell = 247 BCY East Abutment Cell = 2,550 BCY, Training Wall Cell = 5,704 BCY The dredging volume for the main and arc cells was calculated using the average end area method. Dredging areas were calculated from existing and proposed cross sections in AutoCAD. Dredging for the West Closure, East Abutment and training wall cells was calculated by multiplying the plan area of the cells by the height from rock elevation to the existing sediment elevation. The cells were divided into segments to account for the variation in rock elevation across the cells and the volume of dredging for each segment was added to get the total dredging volume.)								
USR USR Spoil Disposal	50,000.00	LCY	Sub	28.10 1,405,126	338,702	34.88 1,743,828	336,485	41.61 2,080,313
(Note: Spoil Disposal Volume = Total Dredging Volume x 1.30 (bulking factor for excavated soils).)								
Cell Templates	1.00	EA	Sub	55,319.64 55,320	13,335	68,654.30 68,654	13,247	81,901.69 81,902
RSM 052119100080 Open web bar joist, K Series, 40-ton job lots, spans up to 30', shop fabricated, incl shop primer, horizontal bridging, maximum	20.00	TON	Sub	2,088.09 41,762	10,067	2,591.42 51,828	10,001	3,091.45 61,829
(Note: This item covers the construction of the Main Cell Template. Main Cell Template is based on the template used at KY River L&D3. The template consisted of set of steel trusses weighing 17 tons. Assume the template here would weigh approximately 20 tons.)								
USR USR Arc Cell Template	1.00	EA	Sub	13,557.84 13,558	3,268	16,825.93 16,826	3,247	20,072.62 20,073
(Note: Arc Cell Template is based on the template used at KY River L&D3. The template consisted of a construction of various steel sections. The quantities and sections used here would be similar, although some substitutions have been made to avoid using sections not found in the Unit Price Book. The assembly for this item includes the following items from the 2010 Cost Book: (1) 05 12 23 75 1580 Structural steel member, 100-ton project, 1 to 2 story building, W12x58, A992 steel, shop fabricated, incl shop primer, bolted connections, 150 LF and (2) 05 12 23 75 0100 Structural steel member,								

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost
100-ton project, 1 to 2 story building, W6x9, A992 steel, shop fabricated, incl shop primer, bolted connections, 70 LF.)								
Sheet Piling	1.00	EA	Sub	2,497,979	602,132	3,100,110	598,191	3,698,301
				43.11		53.51		63.83
USR USR PS27.5 Sheet Piling	34,000.00	SF	Sub	1,465,844	353,338	1,819,182	351,026	2,170,207
(Note: The USR CSI Task for this item was built by determining material costs, estimating a production rate, and creating a USR crew of equipment and laborers. Material Quote from L. B. Foster - Matt O'Kray (Oak Brook, IL office) 800-253-5050 x119 = \$0.80 per LB delivered for PS27.5 Sheet Piling. Material quote from Skyline Steel - Alex Grainger (West Chester, OH office - 513-777-7039) = \$0.98 per LB delivered for PS27.5 sheet piling. Average of two prices equals \$0.89/LB x 27.5 LB/SF (LB/SF from Skyline) = \$24.48/SF. Production rate estimated from Stantec's experience at KY River L&D3 with constructing a cell dam. Production rate was 5 days/main cell and the average square footage of piling per main cell was 3,430 SF/main cell which is equivalent to 68.6 SF/HR. The equipment for the sheet piling crew consists of 2 cranes, 2 barges, 1 tugboat, and 1 pile hammer. The laborers for the sheet piling crew consists of 2 heavy equipment operators for the cranes, 1 foreman (part time), 2 pile drivers, 1 oiler, and 1 medium equipment operator for the tug boat. The area of sheet piling was calculated for each cell by multiplying the number of sheet piles per cell by the width of each sheet pile by the average height from the crest to the top of rock elevation across the cell. The total area of sheet piling was calculated by adding up the area of sheet piling for each cell.)								
				36.52		45.32		54.07
USR USR PZ22 Sheet Piling West Closure Cell	2,400.00	SF	Sub	87,648	21,127	108,775	20,989	129,764
(Note: The USR CSI Task for this item was built by determining material costs, estimating a production rate, and creating a USR crew of equipment and laborers. Material Quote from Skyline Steel - Alex Grainger (West Chester, OH office - 513-777-7039) = \$0.83 per LB x 22 LB/SF (Skyline) = \$18.26/SF delivered for PZ22 sheet piling for piles <=50 ft in length. Production rate estimated from Stantec's experience at KY River L&D3 with constructing a cell dam. Production rate was 5 days/main cell and the average square footage of piling per main cell was 3,430 SF/main cell. The equipment for the sheet piling crew consists of 2 cranes, 2 barges, 1 tugboat, and 1 pile hammer. The laborers for the sheet piling crew consists of 2 heavy equipment operators for the cranes, 1 foreman (part time), 2 pile drivers, 1 oiler, and 1 medium equipment operator for the tug boat. The quantity of sheet piling was calculated for this cell by dividing the cell into segments and multiplying the length of sheet piling by the average height from the rock elevation to the crest across the segment to get the area of sheet piling for that segment. The total area of sheet piling was calculated by adding the area of sheet piling for each segment.)								
				37.22		46.19		55.10
USR USR PZ22 Sheet Piling Cutoff Wall	3,700.00	SF	Sub	137,712	33,195	170,907	32,978	203,885
(Note: The USR CSI Task for this item was built by determining material costs, estimating a production rate, and creating a USR crew of equipment and laborers. Material Quote from Skyline Steel - Alex Grainger (West Chester, OH office - 513-777-7039) = \$0.86 per LB x 22 LB/SF (Skyline) = \$18.92/SF delivered for PZ22 sheet piling for piles 50-70 ft in length. Production rate estimated from Stantec's experience at KY River L&D3 with constructing a cell dam. Production rate was 5 days/main cell and the average square footage of piling per main cell was 3,430 SF/main cell. The equipment for the sheet piling crew consists of 2 cranes, 2 barges, 1 tugboat, and 1 pile hammer. The laborers for the sheet piling crew consists of 2 heavy equipment operators for the cranes, 1 foreman (part time), 2 pile drivers, 1 oiler, and 1 medium equipment operator for the tug boat. The quantity of sheet piling was calculated for this cell by dividing the cell into segments and multiplying the length of sheet piling by the average height from the rock elevation to the crest across the segment to get the area of sheet piling for that segment. The total area of sheet piling was calculated by adding the area of sheet piling for each segment.)								
				47.96		59.52		71.00
USR USR PZ35 East Abutment Cell	7,000.00	SF	Sub	335,701	80,920	416,621	80,390	497,011
(Note: The USR CSI Task for this item was built by determining material costs, estimating a production rate, and creating a USR crew of equipment and laborers. Material Quote from Skyline Steel - Alex Grainger (West Chester, OH office - 513-777-7039) = \$0.83 per LB x 35 LB/SF (Skyline) = \$29.05/SF delivered for PZ35 sheet piling for piles 50-55 ft in length. Production rate estimated from Stantec's experience at KY River L&D3 with constructing a cell dam. Production rate was 5 days/main cell and the average square footage of piling per main cell was 3,430 SF/main cell. The equipment for the sheet piling crew consists of 2 cranes, 2 barges, 1 tugboat, and 1 pile hammer. The laborers for the sheet piling crew consists of 2 heavy equipment operators for the cranes, 1 foreman (part time), 2 pile drivers, 1 oiler, and 1 medium equipment operator for the tug boat. The quantity of sheet piling was calculated for this cell by dividing the cell into segments and multiplying the length of sheet piling by the average height from the rock elevation to the crest across the segment to get the area of sheet piling for that segment. The total area of sheet piling was calculated by adding the area of sheet piling for each segment.)								
				49.07		60.90		72.65
USR USR PZ35 Training Wall Cell	9,600.00	SF	Sub	471,074	113,551	584,626	112,808	697,434
(Note: The USR CSI Task for this item was built by determining material costs, estimating a production rate, and creating a USR crew of equipment and laborers. Material Quote from Skyline Steel - Alex Grainger (West Chester, OH office - 513-777-7039) = \$0.86 per LB x 35 LB/SF (Skyline) = \$30.10/SF delivered for PZ35 sheet piling for piles 55-70 ft in length. Production rate estimated from Stantec's experience at KY River L&D3 with constructing a cell dam. Production rate was 5 days/main cell and the average square footage of piling per main cell was 3,430 SF/main cell. The equipment for the sheet piling crew consists of 2 cranes, 2 barges, 1 tugboat, and 1 pile hammer. The laborers for the sheet piling crew consists of 2 heavy equipment operators for the cranes, 1 foreman (part time), 2 pile								

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost
drivers, 1 oiler, and 1 medium equipment operator for the tug boat. The quantity of sheet piling was calculated for this cell by multiplying the cell perimeter by the height from the top of piling elevation to the top of rock elevation corresponding to TOR at Boring 19.)								
Dewatering	1.00	EA	Sub	46,378	11,179	57,558	11,106	68,664
RSM 312319200900 Dewatering, pumping, 8 hr., attended 8 hours per day, 3" centrifugal pump, includes 20 L.F. of suction hose and 100 L.F. of discharge hose (Note: The quantity for dewatering was calculated using the production rates for sheet piling and concrete.)	60.00	DAY	Sub	46,378	11,179	57,558	11,106	68,664
Clean Bottom of Cells	1.00	EA	Sub	500,117	120,552	620,669	119,763	740,432
USR USR Clean Bottom of Cells (Note: The USR CSI Task for this item was built by estimating a production rate and creating a USR crew of equipment and laborers. The production rate of 35 SF/hour is based on Stantec's experience at KY River L&D3 with constructing a cell dam. The equipment for the crew for this item consists of 1 air compressor, 1 air hose, and 1 15-ton crawler crane. The laborers for the crew consist of 1 heavy equipment operator for the crane, 1 oiler, 1 light equipment operator, 3 laborers, 1 foreman, and 4 divers. Labor costs for the dive crew were obtained from Adam Crace at Stantec 859-433-3084 on March 30, 2011. The labor cost for a 4 man dive crew is \$2,800/day. Assume 10 hour days and that is equivalent to \$70/HR/diver. The quantity for this item corresponds to the surface area of the cell dam.)	16,000.00	SF	Sub	500,117	120,552	620,669	119,763	740,432
Tremie Concrete	1.00	EA	Sub	2,837,573	683,990	3,521,563	679,514	4,201,077
USR USR Tremie Concrete Placement (Note: The USR CSI Task for this item was built by determining material costs, estimating a production rate, and creating a USR crew of equipment and laborers. Material cost from quote from Bill Hazelwood at imi concrete 270-831-0950 on 3/30/2011. Quote #11737. Tremie Concrete = \$118.50/CY (mixed and delivered to the site). Add \$1.05 per CY for Environmental and Energy Charges per direction from quote. So total material price/CY is \$119.55/CY. Production rate is 100 CY/Hour based on experience at the KY River L&D3 cell dam. The equipment for the crew for this task consists of 1 concrete pump, 2 cranes, 2 barges, 1 tug boat, and 1 front-end loader. The laborers for this crew consist of 5 semi-skilled laborers, 1 oiler, 1 medium equipment operator for the tug boat, 1 foreman, and 2 heavy equipment operators for the cranes. The volume of tremie concrete was calculated by multiplying the plan area of the cell dam by the height from rock elevation to the bottom elevation of the concrete cap. The cell dam was divided into segments to account for the variation in rock elevation across the cell dam and the volume of concrete for each segment was added to get the total volume of concrete.)	20,000.00	CY	Sub	2,837,573	683,990	3,521,563	679,514	4,201,077
Reinforced Concrete	1.00	EA	Sub	255,302	61,540	316,842	61,137	377,979
RSM 032110600600 Reinforcing Steel, in place, slab on grade, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories (Note: Per RS Means 03 21 10 60 1050, added 10% to the material cost since the quantity is between 10 and 50 tons. The quantity of steel reinforcement was calculated by first deriving the total reinforcement in lb/SF (plan area). This derivation assumes rebar (No. 3 bars) will be placed on 1-foot spacing each way for two horizontal mats and 4-foot dowels will be placed on 3-foot spacing. The reinforcement in lb/SF was then multiplied by the plan area of the cell caps.)	15.00	TON	Sub	29,050	7,003	36,053	6,957	43,010
RSM 033529300150 Concrete finishing, floors, basic finishing for unspecified flatwork, bull float, manual float & broom finish, includes edging and joints, excludes placing, striking off & consolidating (Note: The quantity for this item corresponds to the surface area of the cell caps.)	16,000.00	SF	Sub	13,074	3,152	16,226	3,131	19,357
USR USR Conventional Concrete Placement (Note: The USR CSI Task for this item was built by determining material costs, estimating a production rate, and creating a USR crew of equipment and laborers. Material cost from quote from Bill	1,900.00	CY	Sub	213,177	51,386	264,563	51,050	315,613

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost
Hazelwood at imi concrete 270-831-0950 on 3/30/2011. Quote #11737. Conventtional Concrete = \$90.50/CY (mixed and delivered to the site). Add \$1.05 per CY for Environmental and Energy Charges per direction from quote. So total price/CY is \$91.55/CY. Production rate of 100 CY/HR based on experience at KY L&D3 cell dam. The equipment for the crew for this task consists of 1 concrete pump, 2 cranes, 2 barges, 1 tug boat, and 1 front-end loader. The laborers for this crew consist of 5 semi-skilled laborers, 1 oiler, 1 medium equipment operator for the tug boat, 1 foreman, and 2 heavy equipment operators for the cranes. The volume of conventional concrete corresponds to the volume of the concrete cap.)								
Bracing	1.00	EA	Sub	325,429	78,444	403,873	77,930	481,803
(Note: Bracing is based on that used at KY River L&D3. The bracing consisted of heavy steel sections. The sections used here are similar, although some adjustments have been made to avoid using sections not found in the Unit Price Book. The quantities for each section used have been adapted for the geometry of the cells at Green River L&D3.)								
RSM 051223755760 Structural steel member, 100-ton project, 1 to 2 story building, W24x117, A992 steel, shop fabricated, incl shop primer, bolted connections	1,400.00	LF	Sub	220,099	53,054	273,154	52,707	325,861
RSM 051223753940 Structural steel member, 100-ton project, 1 to 2 story building, W18x76, A992 steel, shop fabricated, incl shop primer, bolted connections	1,000.00	LF	Sub	105,330	25,389	130,719	25,223	155,942
New Guard Railing	1.00	EA	Sub	3,960	955	4,914	948	5,863
RSM 055213500520 Railing, pipe, steel, primed, 2 rails, 3'-6" high, posts @ 5' O.C., 1-1/2" dia, shop fabricated	100.00	LF	Sub	3,960	955	4,914	948	5,863
QC Borings	1.00	EA	Sub	74,963	18,070	93,032	17,951	110,984
RSM 023213101250 Subsurface investigation, boring and exploratory drilling, drilling in rock, "NX" core, with casing and sampling, includes bit, layout and set up (Note: Total of 20 borings. The length of boring corresponds to the average piling depth for the corresponding cell plus an additional 5 feet.)	850.00	LF	Sub	68,294	16,462	84,756	16,354	101,110
RSM 023213100300 Subsurface investigation, boring and exploratory drilling, mobilization and demobilization, minimum (Note: Total of 20 borings. Assume 2 borings/mobilization and demobilization)	10.00	LS	Sub	6,669	1,608	8,276	1,597	9,874
Site Restoration	1.00	EA	Sub	102,619	24,736	127,355	24,574	151,930
RSM 312323145220 Backfill, structural, common earth, 300 H.P. dozer, 150' haul (Note: This item covers earth backfill at the east end of the cellular dam. Assume that half of the total backfill consists of earth backfill.)	2,450.00	LCY	Sub	2,238	540	2,778	536	3,314
RSM 353116196000 Steel sheet piling seawalls, crushed stone, placed behind bulkhead by clam bucket (Note: This item covers gravel backfill at east end of cellular dam. Assume that half of the total backfill consists of gravel backfill.)	2,450.00	LCY	Sub	95,707	23,070	118,777	22,919	141,696
RSM 312323235640 Compaction, 4 passes, 6" lifts, riding, sheepsfoot or wobbly wheel roller	2,750.00	ECY	Sub	2,853	688	3,540	683	4,223

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost
(Note: The quantity for compaction corresponds to the volume of earth backfill divided by 0.9 to account for compaction.)								
RSM 312216103300 Fine grading, slopes, gentle, finish grading (Note: The quantity for grading is equal to the clearing and grubbing area.)	2,950.00	SY	Sub	0.15 435	105	0.18 539	104	0.22 643
RSM 329219131000 Seeding, mechanical seeding hydro or air seeding for large areas, includes lime, fertilizer and seed (Note: The quantity for seeding is equal to the clearing and grubbing area.)	2,950.00	SY	Sub	0.47 1,387	334	0.58 1,721	332	0.70 2,053
Restore Portion of County Road 1273 as Gravel Road (Note: This item covers restoration for a 140-foot-long and 15-foot-wide section of County Road 1273.)	1.00	EA	Sub	1,891.20 1,891	456	2,347.06 2,347	453	2,799.95 2,800
RSM 015523500050 Temporary, roads, gravel fill, 4" gravel depth, excl surfacing	240.00	SY	Sub	7.88 1,891	456	9.78 2,347	453	11.67 2,800
0402 Spillway	1.00	EA	Sub	12,031.49 12,031	2,900	14,931.65 14,932	2,881	17,812.83 17,813
Diversion of Water	1.00	EA	Sub	4,710.23 4,710	1,135	5,845.62 5,846	1,128	6,973.58 6,974
RSM 312319200900 Dewatering, pumping, 8 hr., attended 8 hours per day, 3" centrifugal pump, includes 20 L.F. of suction hose and 100 L.F. of discharge hose (Note: The quantity for dewatering is based on the assumption that it will take 5 days to construct the weir.)	5.00	DAY	Sub	772.97 3,865	932	959.30 4,796	926	1,144.40 5,722
HTW 312513101401 Sandbags, 14" x 26" (Note: The sandbags will be used to build a small cofferdam for water diversion. The 2010 Cost Book item 31 25 13 10 1401 provides material costs for sandbags. A USR Sandbag crew was added to this item to provide labor costs. The crew consists of 2 laborers and the production rate is based on the assumption that the crew can place 5 sandbags/minute.)	750.00	EA	Sub	1.13 845	204	1.40 1,049	202	1.67 1,252
Rock Excavation	1.00	EA	Sub	859.21 859	207	1,066.33 1,066	206	1,272.08 1,272
HNC 312316340600 Rock excavation, dense rock, with air hammer (Note: The rock excavation quantity was calculated based on the assumption that 6 inches of rock will be excavated over the footprint of the weir to clean the rock surface.)	10.00	BCY	Sub	36.14 361	87	44.85 449	87	53.51 535
RSM 024119180300 Selective demolition, disposal only, urban buildings with salvage value allowed, concrete frame, includes loading and 5 mile haul to dump (Note: This item covers the disposal of excavated rock. Multiply labor (4.81) and equipment costs (4.25) by a factor of 3 since we assume a 15 mile haul to dump.)	15.00	CY	Sub	33.19 498	120	41.19 618	119	49.13 737
Reinforced Concrete	1.00	EA	Sub	6,462.05 6,462	1,558	8,019.71 8,020	1,547	9,567.17 9,567
RSM 032110600600 Reinforcing Steel, in place, slab on grade, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories (Note: Per RS Means 03 21 10 60 1050, added 10% to the material cost since the quantity is between 10 and 50 tons. The quantity of steel reinforcement was calculated by first deriving the total reinforcement in lb/SF (plan area). This derivation assumes rebar (No. 3 bars) will be placed on 1-foot spacing each way for two horizontal mats and 4-foot dowels will be placed on 3-foot spacing. The reinforcement in lb/SF was then multiplied by the plan area of the weir.)	1.00	TON	Sub	1,936.70 1,937	467	2,403.53 2,404	464	2,867.31 2,867

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost
USR USR Conventional Concrete Placement (Note: The USR CSI Task for this item was built by determining material costs, estimating a production rate, and creating a USR crew of equipment and laborers. Material cost from quote from Bill Hazelwood at imi concrete 270-831-0950 on 3/30/2011. Quote #11737. Conventional Concrete = \$90.50/CY (mixed and delivered to the site). Add \$1.05 per CY for Environmental and Energy Charges per direction from quote. So total price/CY is \$91.55/CY. Production rate of 100 CY/HR based on experience at KY L&D3 cell dam. The equipment for the crew for this task consists of 1 concrete pump, 2 cranes, 2 barges, 1 tug boat, and 1 front-end loader. The laborers for this crew consist of 5 semi-skilled laborers, 1 oiler, 1 medium equipment operator for the tug boat, 1 foreman, and 2 heavy equipment operators for the cranes. The volume of conventional concrete corresponds to the volume of the weir.)	40.00	CY	Sub	112.20 4,488	1,082	139.24 5,570	1,075	166.11 6,644
RSM 031113651400 C.I.P. concrete forms, bulkhead for slab on grade w/ keyway, 4-1/2" high, exp metal, includes erecting, bracing, stripping and cleaning	10.00	LF	Sub	3.74 37	9	4.64 46	9	5.54 55
05 Locks	1.00	EA	Sub	497,258.52 497,259	119,863	617,121.45 617,121	119,078	736,199.92 736,200
Demolish Railing Parallel to Land Lock Wall	1.00	EA	Sub	1,248.32 1,248	301	1,549.23 1,549	299	1,848.16 1,848
RSM 024113660500 Selective demolition, misc metal fences & gates, metal tubular picket fences, 4'-6' high	320.00	LF	Sub	2.58 826	199	3.20 1,025	198	3.82 1,223
RSM 024119180200 Selective demolition, disposal only, urban buildings with salvage value allowed, steel frame, includes loading and 5 mile haul to dump (Note: Increase bare cost by a factor of 3.0 since a 15-mile haul to dump is assumed for the project. Disposal Volume = 2 x Volume of posts and rails to account for bulking.)	15.00	CY	Sub	28.16 422	102	34.95 524	101	41.70 625
Replace Railing Parallel to Land Lock Wall	1.00	EA	Sub	12,671.78 12,672	3,055	15,726.28 15,726	3,035	18,760.79 18,761
RSM 055213500520 Railing, pipe, steel, primed, 2 rails, 3'-6" high, posts @ 5' O.C., 1-1/2" dia, shop fabricated	320.00	LF	Sub	39.60 12,672	3,055	49.14 15,726	3,035	58.63 18,761
Demolish Upper Guard and Upper Guide Walls	1.00	EA	Sub	357,220.02 357,220	86,107	443,327.02 443,327	85,543	528,870.48 528,870
RSM 024113900300 Selective demolition, retaining walls, concrete retaining wall, 10' high, excludes reinforcing (Note: Multiply Labor and Equip costs by factor of 1.2 since concrete portion of wall is 12' high. Quantity corresponds to length of upper guard wall and upper guide wall to be demolished.)	230.00	LF	Sub	363.60 83,629	20,158	451.25 103,787	20,027	538.32 123,814
RSM 024119180300 Selective demolition, disposal only, urban buildings with salvage value allowed, concrete frame, includes loading and 5 mile haul to dump (Note: This item covers the disposal of demolished concrete. Multiply labor (4.81) and equipment costs (4.25) by a factor of 3 since we assume a 15 mile haul to dump. Disposal Volume = Demolition Volume x 1.5 to account for bulking.)	1,100.00	CY	Sub	33.19 36,505	8,799	41.19 45,304	8,742	49.13 54,046
RSM 024116130700 Building demolition, small buildings or single buildings, wood, elevated slabs, includes 20 mile haul, excludes salvage, foundation demolition or dump fees (Note: The quantity corresponds to the volume of the timber portion of the guard and guide walls to be demolished.)	60,000.00	CF	Sub	0.27 16,371	3,946	0.34 20,317	3,920	0.40 24,237

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost
RSM 024119180500 Selective demolition, disposal only, urban buildings with salvage value allowed, wood frame, includes loading and 5 mile haul to dump (Note: This item covers the disposal of demolished timber. Multiply labor (7.11) and equipment costs (6.28) by a factor of 3 since we assume a 15 mile haul to dump. Timber Disposal = Volume of timber demolision x 2.0 to account for bulking.)	4,500.00	CY	Sub	^{49.05} 220,716	53,203	^{60.87} 273,919	52,855	^{72.62} 326,774
Safety Signage	1.00	EA	Sub	^{177.00} 177	43	^{219.66} 220	42	^{262.05} 262
HTW 019413207911 Safety signs (yellow and magenta), aluminum/acrylic, 10" x 14"	6.00	EA	Sub	^{29.50} 177	43	^{36.61} 220	42	^{43.67} 262
Dredging to Open Gates	1.00	EA	Sub	^{105,148.59} 105,149	25,346	^{130,494.39} 130,494	25,180	^{155,674.32} 155,674
RSM 352023130310 Mechanical dredging, 20 miles, barge mounted clamshell excavation into scows, dumped at sea, minimum (Note: The dredging volume to open the lock gates was calculated by multiplying the dredging area by the height from the gate sill elevation to the existing sediment elevation. The dredging area was divided into segments to account for the variation in the top of sediment elevation across the lock and the volume of dredging for each segment was added to get the total dredging volume.)	2,100.00	BCY	Sub	^{13.54} 28,429	6,853	^{16.80} 35,281	6,808	^{20.04} 42,089
USR USR Spoil Disposal (Note: Spoil Disposal Volume = Total Dredging Volume x 1.30 (bulking factor for excavated soils).)	2,730.00	LCY	Sub	^{28.10} 76,720	18,493	^{34.88} 95,213	18,372	^{41.61} 113,585
Pin Lower Gates Open	1.00	EA	Sub	^{9,663.32} 9,663	2,329	^{11,992.64} 11,993	2,314	^{14,306.72} 14,307
(Note: The tie-back consist of a W section, a thin steel plate, and an anchor rod. The W-section size was assumed to be a W8x58 section based on similar designs at Kentucky River Lock No. 5, 6, & 7. Since this size was unavailable in 2010 RS Means, the larger W12x58 was chosen. The extra material and cost of the W12x58 was assumed to account for the steel required for the steel plate and anchor rod. Due to limited design drawings, the actual geometry of the lock gates and stiffeners is unknown. Therefore, the length of the weld between the W section and the gate stiffener was assumed to be 6 linear feet per W section.)								
RSM 051223751580 Structural steel member, 100-ton project, 1 to 2 story building, W12x58, A992 steel, shop fabricated, incl shop primer, bolted connections	70.00	LF	Sub	^{81.02} 5,671	1,367	^{100.55} 7,038	1,358	^{119.95} 8,396
RSM 050521901610 Welding structural steel in field, single pass, 0.4 Lb/LF, 5/16" thick, continuous fillet, type 6011	50.00	LF	Sub	^{19.63} 981	237	^{24.36} 1,218	235	^{29.06} 1,453
RSM 050521904010 Welding structural steel in field, cleaning & welding plates/bars/rods to existing beams/columns/trusses	50.00	LF	Sub	^{60.22} 3,011	726	^{74.73} 3,736	721	^{89.15} 4,457
Restore Concrete Esplanade	1.00	EA	Sub	^{11,129.49} 11,129	2,683	^{13,812.23} 13,812	2,665	^{16,477.40} 16,477
(Note: Total area of esplanade is 867 SY. Assume 50% of esplanade will need restoration.)								
RSM 321313230020 Concrete paving surface treatment, 4500 psi, fixed form, unreinforced, 12' pass, 6" thick, includes joints, finishing, and curing	450.00	SY	Sub	^{24.73} 11,129	2,683	^{30.69} 13,812	2,665	^{36.62} 16,477

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost
(Note: Total area of esplanade is 867 SY. Assume 50% of esplanade will need restoration.)								
30 Planning, Engineering and Design	1.00	EA	Prime	<i>734,795.00</i> 734,795	0	<i>734,795.00</i> 734,795	141,785	<i>876,579.51</i> 876,580
(Note: Costs based on 8% of Project Direct Cost per James J. Vermillion, CCC, Cost Engineer, USACE Louisville District.)								
USR USR Planning, Engineering, & Design	1.00	LS	Prime	734,795	0	734,795	141,785	876,580
(Note: Costs based on 8% of Project Direct Cost per James J. Vermillion, CCC, Cost Engineer, USACE Louisville District. Used 8% of \$9,184,928 which corresponds to the total project direct costs for all items except for Planning, Engineering, & Design.)								

Green River LD 3

Description	Quantity	UOM	DirectLabor	DirectEQ	DirectMatl	DirectSubBid	DirectUserCost	DirectCost	DirectCost	CostOverride
Project Direct Costs Report			2,302,148	2,124,442	4,758,337	734,795	0	9,919,723	9,919,723	
			<i>1,993,484.44</i>	<i>1,958,980.39</i>	<i>4,735,204.33</i>	<i>0.00</i>		<i>8,687,669.16</i>	<i>8,687,669.16</i>	
04 Dams	1.00	EA	1,993,484	1,958,980	4,735,204	0	0	8,687,669	8,687,669	
			<i>1,987,456.96</i>	<i>1,958,273.62</i>	<i>4,729,907.09</i>	<i>0.00</i>		<i>8,675,637.67</i>	<i>8,675,637.67</i>	
0401 Main Dam	1.00	EA	1,987,457	1,958,274	4,729,907	0	0	8,675,638	8,675,638	
			<i>1,987,456.96</i>	<i>1,958,273.62</i>	<i>4,729,907.09</i>	<i>0.00</i>		<i>8,675,637.67</i>	<i>8,675,637.67</i>	
Cellular Dam	1.00	EA	1,987,457	1,958,274	4,729,907	0	0	8,675,638	8,675,638	
(Note: Bracing is based on that used at KY River L&D3. The bracing consisted of heavy steel sections. The sections used here are similar, although some adjustments have been made to avoid using sections not found in the Unit Price Book. The quantities for each section used have been adapted for the geometry of the cells at Green River L&D3.)										
(Note: This item covers restoration for a 140-foot-long and 15-foot-wide section of County Road 1273.)										
RSM 015523500050 Temporary, roads, gravel fill, 4" gravel depth, excl surfacing	240.00	SY	<i>3.41</i> 819	<i>0.23</i> 54	<i>4.24</i> 1,018	<i>0.00</i> 0		<i>7.88</i> 1,891	<i>7.88</i> 1,891	N
			<i>6,027.48</i>	<i>706.77</i>	<i>5,297.24</i>	<i>0.00</i>		<i>12,031.49</i>	<i>12,031.49</i>	
0402 Spillway	1.00	EA	6,027	707	5,297	0	0	12,031	12,031	
			<i>4,051.41</i>	<i>150.02</i>	<i>508.80</i>	<i>0.00</i>		<i>4,710.23</i>	<i>4,710.23</i>	
Diversion of Water	1.00	EA	4,051	150	509	0	0	4,710	4,710	
			<i>742.97</i>	<i>30.00</i>	<i>0.00</i>	<i>0.00</i>		<i>772.97</i>	<i>772.97</i>	
RSM 312319200900 Dewatering, pumping, 8 hr., attended 8 hours per day, 3" centrifugal pump, includes 20 L.F. of suction hose and 100 L.F. of discharge hose	5.00	DAY	3,715	150	0	0	0	3,865	3,865	N
(Note: The quantity for dewatering is based on the assumption that it will take 5 days to construct the weir.)										
HTW 312513101401 Sandbags, 14" x 26"	750.00	EA	<i>0.45</i> 337	<i>0.00</i> 0	<i>0.68</i> 509	<i>0.00</i> 0		<i>1.13</i> 845	<i>1.13</i> 845	N
(Note: The sandbags will be used to build a small cofferdam for water diversion. The 2010 Cost Book item 31 25 13 10 1401 provides material costs for sandbags. A USR Sandbag crew was added to this item to provide labor costs. The crew consists of 2 laborers and the production rate is based on the assumption that the crew can place 5 sandbags/minute.)										
			<i>646.91</i>	<i>212.30</i>	<i>0.00</i>	<i>0.00</i>		<i>859.21</i>	<i>859.21</i>	
Rock Excavation	1.00	EA	647	212	0	0	0	859	859	
			<i>34.04</i>	<i>2.10</i>	<i>0.00</i>	<i>0.00</i>		<i>36.14</i>	<i>36.14</i>	
HNC 312316340600 Rock excavation, dense rock, with air hammer	10.00	BCY	340	21	0	0	0	361	361	N
(Note: The rock excavation quantity was calculated based on the assumption that 6 inches of rock will be excavated over the footprint of the weir to clean the rock surface.)										
			<i>20.44</i>	<i>12.75</i>	<i>0.00</i>	<i>0.00</i>		<i>33.19</i>	<i>33.19</i>	
RSM 024119180300 Selective demolition, disposal only, urban buildings with salvage value allowed, concrete frame, includes loading and 5	15.00	CY	307	191	0	0	0	498	498	LE

Description	Quantity	UOM	DirectLabor	DirectEQ	DirectMatl	DirectSubBid	DirectUserCost	DirectCost	DirectCost	CostOverride
mile haul to dump (Note: This item covers the disposal of excavated rock. Multiply labor (4.81) and equipment costs (4.25) by a factor of 3 since we assume a 15 mile haul to dump.)			1,329.16	344.45	4,788.44	0.00		6,462.05	6,462.05	
Reinforced Concrete	1.00 EA		1,329	344	4,788	0	0	6,462	6,462	
RSM 032110600600 Reinforcing Steel, in place, slab on grade, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories (Note: Per RS Means 03 21 10 60 1050, added 10% to the material cost since the quantity is between 10 and 50 tons. The quantity of steel reinforcement was calculated by first deriving the total reinforcement in lb/SF (plan area). This derivation assumes rebar (No. 3 bars) will be placed on 1-foot spacing each way for two horizontal mats and 4-foot dowels will be placed on 3-foot spacing. The reinforcement in lb/SF was then multiplied by the plan area of the weir.)	1.00 TON		1,051	0	886	0	0	1,936.70 1,937	1,936.70 1,937	M
USR Conventional Concrete Placement (Note: The USR CSI Task for this item was built by determining material costs, estimating a production rate, and creating a USR crew of equipment and laborers. Material cost from quote from Bill Hazelwood at imi concrete 270-831-0950 on 3/30/2011. Quote #11737. Conventional Concrete = \$90.50/CY (mixed and delivered to the site). Add \$1.05 per CY for Environmental and Energy Charges per direction from quote. So total price/CY is \$91.55/CY. Production rate of 100 CY/HR based on experience at KY L&D3 cell dam. The equipment for the crew for this task consists of 1 concrete pump, 2 cranes, 2 barges, 1 tug boat, and 1 front-end loader. The laborers for this crew consist of 5 semi-skilled laborers, 1 oiler, 1 medium equipment operator for the tug boat, 1 foreman, and 2 heavy equipment operators for the cranes. The volume of conventional concrete corresponds to the volume of the weir.)	40.00 CY		262	344	3,882	0	0	112.20 4,488	112.20 4,488	N
RSM 031113651400 C.I.P. concrete forms, bulkhead for slab on grade w/ keyway, 4-1/2" high, exp metal, includes erecting, bracing, stripping and cleaning	10.00 LF		17	0	21	0	0	37	37	N
05 Locks	1.00 EA		308,664	165,462	23,133	0	0	497,259	497,259	
Demolish Railing Parallel to Land Lock Wall	1.00 EA		983	266	0	0	0	1,248	1,248	
RSM 024113660500 Selective demolition, misc metal fences & gates, metal tubular picket fences, 4'-6' high	320.00 LF		723	103	0	0	0	826	826	N
RSM 024119180200 Selective demolition, disposal only, urban buildings with salvage value allowed, steel frame, includes loading and 5 mile haul to dump (Note: Increase bare cost by a factor of 3.0 since a 15-mile haul to dump is assumed for the project. Disposal Volume = 2 x Volume of posts and rails to account for bulking.)	15.00 CY		260	162	0	0	0	422	422	LE

Green River LD 3

Description	Quantity	UOM	DirectLabor	DirectEQ	DirectMatl	DirectSubBid	DirectUserCost	DirectCost	DirectCost	CostOverride
			4,884.38	155.40	7,632.00	0.00		12,671.78	12,671.78	
Replace Railing Parallel to Land Lock Wall	1.00	EA	4,884	155	7,632	0	0	12,672	12,672	
			15.26	0.49	23.85	0.00		39.60	39.60	
RSM 055213500520 Railing, pipe, steel, primed, 2 rails, 3'-6" high, posts @ 5' O.C., 1-1/2" dia, shop fabricated	320.00	LF	4,884	155	7,632	0	0	12,672	12,672	N
			246,099.48	111,120.54	0.00	0.00		357,220.02	357,220.02	
Demolish Upper Guard and Upper Guide Walls	1.00	EA	246,099	111,121	0	0	0	357,220	357,220	
			337.40	26.20	0.00	0.00		363.60	363.60	
RSM 024113900300 Selective demolition, retaining walls, concrete retaining wall, 10' high, excludes reinforcing	230.00	LF	77,603	6,026	0	0	0	83,629	83,629	LE
(Note: Multiply Labor and Equip costs by factor of 1.2 since concrete portion of wall is 12' high. Quantity corresponds to length of upper guard wall and upper guide wall to be demolished.)										
			20.44	12.75	0.00	0.00		33.19	33.19	
RSM 024119180300 Selective demolition, disposal only, urban buildings with salvage value allowed, concrete frame, includes loading and 5 mile haul to dump	1,100.00	CY	22,480	14,025	0	0	0	36,505	36,505	LE
(Note: This item covers the disposal of demolished concrete. Multiply labor (4.81) and equipment costs (4.25) by a factor of 3 since we assume a 15 mile haul to dump. Disposal Volume = Demolition Volume x 1.5 to account for bulking.)										
			0.17	0.10	0.00	0.00		0.27	0.27	
RSM 024116130700 Building demolition, small buildings or single buildings, wood, elevated slabs, includes 20 mile haul, excludes salvage, foundation demolition or dump fees	60,000.00	CF	10,081	6,290	0	0	0	16,371	16,371	N
(Note: The quantity corresponds to the volume of the timber portion of the guard and guide walls to be demolished.)										
			30.21	18.84	0.00	0.00		49.05	49.05	
RSM 024119180500 Selective demolition, disposal only, urban buildings with salvage value allowed, wood frame, includes loading and 5 mile haul to dump	4,500.00	CY	135,936	84,780	0	0	0	220,716	220,716	LE
(Note: This item covers the disposal of demolished timber. Multiply labor (7.11) and equipment costs (6.28) by a factor of 3 since we assume a 15 mile haul to dump. Timber Disposal = Volume of timber demolision x 2.0 to account for bulking.)										
			0.00	0.00	177.00	0.00		177.00	177.00	
Safety Signage	1.00	EA	0	0	177	0	0	177	177	
			0.00	0.00	29.50	0.00		29.50	29.50	

Green River LD 3

Description	Quantity	UOM	DirectLabor	DirectEQ	DirectMatl	DirectSubBid	DirectUserCost	DirectCost	DirectCost	CostOverride
HTW 019413207911 Safety signs (yellow and magenta), aluminum/acrylic, 10" x 14"	6.00	EA	0	0	177	0	0	177	177	N
			52,077.27	53,071.32	0.00	0.00		105,148.59	105,148.59	
Dredging to Open Gates	1.00	EA	52,077	53,071	0	0	0	105,149	105,149	
			8.41	5.13	0.00	0.00		13.54	13.54	
RSM 352023130310 Mechanical dredging, 20 miles, barge mounted clamshell excavation into scows, dumped at sea, minimum	2,100.00	BCY	17,661	10,768	0	0	0	28,429	28,429	N
(Note: The dredging volume to open the lock gates was calculated by multiplying the dredging area by the height from the gate sill elevation to the existing sediment elevation. The dredging area was divided into segments to account for the variation in the top of sediment elevation across the lock and the volume of dredging for each segment was added to get the total dredging volume.)										
USR USR Spoil Disposal	2,730.00	LCY	34,416	42,304	0	0	0	76,720	76,720	N
(Note: Spoil Disposal Volume = Total Dredging Volume x 1.30 (bulking factor for excavated soils).)										
			3,833.89	522.54	5,306.89	0.00		9,663.32	9,663.32	
Pin Lower Gates Open	1.00	EA	3,834	523	5,307	0	0	9,663	9,663	
(Note: The tie-back consist of a W section, a thin steel plate, and an anchor rod. The W-section size was assumed to be a W8x58 section based on similar designs at Kentucky River Lock No. 5, 6, & 7. Since this size was unavailable in 2010 RS Means, the larger W12x58 was chosen. The extra material and cost of the W12x58 was assumed to account for the steel required for the steel plate and anchor rod. Due to limited design drawings, the actual geometry of the lock gates and stiffeners is unknown. Therefore, the length of the weld between the W section and the gate stiffener was assumed to be 6 linear feet per W section.)										
			5.44	1.38	74.20	0.00		81.02	81.02	
RSM 051223751580 Structural steel member, 100-ton project, 1 to 2 story building, W12x58, A992 steel, shop fabricated, incl shop primer, bolted connections	70.00	LF	381	97	5,194	0	0	5,671	5,671	N
			16.58	2.04	1.01	0.00		19.63	19.63	
RSM 050521901610 Welding structural steel in field, single pass, 0.4 Lb/LF, 5/16" thick, continuous fillet, type 6011	50.00	LF	829	102	50	0	0	981	981	N
			52.49	6.47	1.25	0.00		60.22	60.22	
RSM 050521904010 Welding structural steel in field, cleaning & welding plates/bars/rods to existing beams/columns/trusses	50.00	LF	2,624	324	63	0	0	3,011	3,011	N
			786.12	326.37	10,017.00	0.00		11,129.49	11,129.49	
Restore Concrete Esplanade	1.00	EA	786	326	10,017	0	0	11,129	11,129	
(Note: Total area of esplanade is 867 SY. Assume 50% of esplanade will need restoration.)										
			1.75	0.73	22.26	0.00		24.73	24.73	
RSM 321313230020 Concrete paving surface treatment, 4500 psi, fixed form,	450.00	SY	786	326	10,017	0	0	11,129	11,129	N

Description	Quantity	UOM	DirectLabor	DirectEQ	DirectMatl	DirectSubBid	DirectUserCost	DirectCost	DirectCost	CostOverride
unreinforced, 12' pass, 6" thick, includes joints, finishing, and curing (Note: Total area of esplanade is 867 SY. Assume 50% of esplanade will need restoration.)			0.00	0.00	0.00	734,795.00		734,795.00	734,795.00	
30 Planning, Engineering and Design	1.00	EA	0	0	0	734,795	0	734,795	734,795	
(Note: Costs based on 8% of Project Direct Cost per James J. Vermillion, CCC, Cost Engineer, USACE Louisville District.)										
USR USR Planning, Engineering, & Design	1.00	LS	0	0	0	734,795	0	734,795	734,795	Sb
(Note: Costs based on 8% of Project Direct Cost per James J. Vermillion, CCC, Cost Engineer, USACE Louisville District. Used 8% of \$9,184,928 which corresponds to the total project direct costs for all items except for Planning, Engineering, & Design.)										

Description	Quantity	UOM	DirectLabor	DirectEQ	DirectMatl	DirectSubBid	DirectUserCost	DirectShip	DirectCost	C/O
Job Office Overhead Direct Cost Report										
Prime										
Sub										
Overhead	1.00	EA	322,583	184,421	43,491	48,824	0	0	599,318	
			322,582.68	184,420.70	43,490.74	48,824.00		0.00	599,318.13	
USR ST Small Tools	1.00	EA	0	0	0	0	0	0	0	
			0.00	0.00	0.00	0.00		0.00	0.00	
USR ST Small Tools	1.00	EA	0	0	0	0	0	0	0	
			0.00	0.00	0.00	0.00		0.00	0.00	
Job Office	1.00	EA	1,210	0	21,379	2,124	0	0	24,713	
			1,209.81	0.00	21,379.14	2,124.00		0.00	24,712.95	
USR USR Job Office Expenses	24.00	MO	0	0	19,233	2,124	0	0	21,357	
			0.00	0.00	801.36	88.50		0.00	889.86	
RSM 015113500060 Temporary electrical power equipment (pro-rated per job), overhead feed, 3 uses, 600 amp	1.00	EA	1,210	0	2,147	0	0	0	3,356	
			1,209.81	0.00	2,146.50	0.00		0.00	3,356.31	
Civil Superintendent	1.00	EA	208,588	29,942	0	42,608	0	0	281,138	
			208,588.00	29,942.46	0.00	42,608.00		0.00	281,138.46	
USR USR_013113200310 Civil superintendent	16.00	MO	208,588	29,942	0	42,608	0	0	281,138	
			13,036.75	1,871.40	0.00	2,663.00		0.00	17,571.15	
(Note: Assume civil superintendent works from May 2015-December 2015 and May 2016-December 2016 for a total of 16 months. SubBid Cost consists of per diem/month for site superintendent. Per diem rate obtained from GSA FY 2011 Per Diem Rates for Kentucky - http://www.gsa.gov/portal/category/100120 \$77/day for lodging + \$46/day for meals and incidental expenses = \$123/day per diem. \$123/day per diem x 5 days/week x 4.33 weeks/month = \$2663 per diem/month. Equipment cost consists of 4x4 truck for superintendent's use.)										
Laboratory Testing	1.00	EA	0	0	0	4,092	0	0	4,092	
			0.00	0.00	0.00	4,092.00		0.00	4,092.00	
RSM 014523504900 Soil testing, Proctor compaction, 4" standard mold, ASTM D 698	6.00	EA	0	0	0	738	0	0	738	
			0.00	0.00	0.00	123.00		0.00	123.00	
RSM 014523502600 Concrete testing, mix design, one batch mix	12.00	EA	0	0	0	3,108	0	0	3,108	
			0.00	0.00	0.00	259.00		0.00	259.00	
RSM 014523504220 Reinforcing steel, tensile test, #9 to #11 bar	6.00	EA	0	0	0	246	0	0	246	
			0.00	0.00	0.00	41.00		0.00	41.00	
			1,365.77	90.22	1,696.00	0.00		0.00	3,151.99	

Description	Quantity	UOM	DirectLabor	DirectEQ	DirectMatl	DirectSubBid	DirectUserCost	DirectShip	DirectCost	C/O
Maintain Access and Parking Areas	1.00	EA	1,366	90	1,696	0	0	0	3,152	
			3.41	0.23	4.24	0.00		0.00	7.88	
RSM 015523500050 Temporary, roads, gravel fill, 4" gravel depth, excl surfacing (Note: Provides one parking area south of East Abutment Cell and a second parking area north of the concrete esplanade at the lock.)	400.00	SY	1,366	90	1,696	0	0	0	3,152	
			265.69	0.00	20,415.60	0.00		0.00	20,681.29	
Sediment Control	1.00	EA	266	0	20,416	0	0	0	20,681	
			0.66	0.00	0.42	0.00		0.00	1.09	
RSM 312513101100 Synthetic erosion control, silt fence, polypropylene, adverse conditions, 3' high	400.00	LF	266	0	170	0	0	0	435	
			0.00	0.00	10,123.00	0.00		0.00	10,123.00	
USR Silt Curtain	2.00	EA	0	0	20,246	0	0	0	20,246	
(Note: Costs from KY LD3 Estimate Alan Rauch: Call to Elastec/American Marine on 14Jan08 (rep = Duane Bennish 800-871-4156 ext 17) For 200 ft by 25 deep, for heavy flow conditions - Panels: 2 @ \$3210 each - Anchors 8 @ \$300 each - Toe Bridles 4 @ \$77 each. 2008 cost per curtain is \$9500. Multiply \$9500 x 0.52% to escalate from 2008 to 2010.)										
			22,663.53	0.00	0.00	0.00		0.00	22,663.53	
Surveying	1.00	EA	22,664	0	0	0	0	0	22,664	
			1,133.18	0.00	0.00	0.00		0.00	1,133.18	
RSM 017123131100 Boundary & survey markers, crew for building layout, 2 person crew	20.00	DAY	22,664	0	0	0	0	0	22,664	
			0.00	52,099.88	0.00	0.00		0.00	52,099.88	
4x4 Trucks	1.00	EA	0	52,100	0	0	0	0	52,100	
			0.00	10.85	0.00	0.00		0.00	10.85	
GEN T50Z7320 TRUCK, HIGHWAY, CONVENTIONAL, 8,800 LB (3,992 KG) GVW, 4X4, 2 AXLE, 3/4 TON (0.68 MT) - PICKUP	4,800.00	HR	0	52,100	0	0	0	0	52,100	
			5,409.62	1,717.31	0.00	0.00		0.00	7,126.93	
Clearing and Grubbing	1.00	EA	5,410	1,717	0	0	0	0	7,127	
			9,016.03	2,862.18	0.00	0.00		0.00	11,878.21	
RSM 311110100300 Clearing & grubbing, heavy trees, to 24" diameter, cut and chip	0.60	ACR	5,410	1,717	0	0	0	0	7,127	
			83,080.27	100,570.82	0.00	0.00		0.00	183,651.09	
Equipment Mobilization	1.00	EA	83,080	100,571	0	0	0	0	183,651	
			70,115.38	92,408.43	0.00	0.00		0.00	162,523.81	
Barge Mobilization	1.00	EA	70,115	92,408	0	0	0	0	162,524	
(Note: This item covers mobilization and demobilization for a barge and tugboat. Less expensive option for the barges is to mobilize and demobilize each barge once and pay the rental fee for each barge over the winter break in construction activity from January through April 2016.)										
RSM 352023130100 Mechanical dredging, mobilization and demobilization, add to below, maximum	2.00	LS	70,115	39,363	0	0	0	0	109,479	
(Note: Assume two mobilization and demobilizations to cover the two barges (1 work barge and 1 material transport barge).)										

Description	Quantity	UOM	DirectLabor	DirectEQ	DirectMatl	DirectSubBid	DirectUserCost	DirectShip	DirectCost	C/O
			0.00	2,824.90	0.00	0.00		0.00	2,824.90	
USR Material Transport Barge Standby Rental	4.00	MO	0	11,300	0	0	0	0	11,300	
(Note: Less expensive option for mobilization is to rent the barge over the winter break in construction rather than performing 2 mobs and 2 demobs. This item covers rental of the barge over the break in construction activity from Jan 2016 through April 2016. Assume that barge will not be operated over the winter break; therefore, there are no operating costs. Rental cost from 2006 R.S. Means 01-54-33-80-0200. 2010 RS Means does not have this item, 2006 cost is escalated to 2010.)										
			0.00	4,014.31	0.00	0.00		0.00	4,014.31	
USR Work Barge Standby Rental	4.00	MO	0	16,057	0	0	0	0	16,057	
(Note: Less expensive option for mobilization is to rent the barge over the winter break in construction rather than performing 2 mobs and 2 demobs. This item covers rental of the barge over the break in construction activity from Jan 2016 through April 2016. Assume that barge will not be operated over the winter break; therefore, there are no operating costs. Rental cost from 2006 R.S. Means 01-54-33-80-0240. 2010 RS Means does not have this item, 2006 cost is escalated to 2010.)										
			0.00	29.87	0.00	0.00		0.00	29.87	
USR Tugboat Rental	860.00	HR	0	25,688	0	0	0	0	25,688	
(Note: Less expensive option is to leave tugboat and barges at site during winter break of construction activity from Jan 2016 through April 2016. Assume 215 hours in one month so quantity is 860. Rental rate comes from equipment cost for standby condition of Equipment Tag XX0Z9720.)										
			324.03	389.44	0.00	0.00		0.00	713.47	
Backhoe Mobilization	1.00	EA	324	389	0	0	0	0	713	
			81.01	97.36	0.00	0.00		0.00	178.37	
RSM 015436500020 Mobilization or demobilization, dozer, loader, backhoe or excavator, 70 H.P. to 150 H.P., up to 50 miles	4.00	EA	324	389	0	0	0	0	713	
(Note: The less expensive option for mobilization of the backhoe is to perform 2 mobilizations and 2 demobilizations rather than pay the rental fee over the winter break in construction activity from January to April 2016. Quantity is 4 to cover 2 mobilizations and 2 demobilizations.)										
			324.03	389.44	0.00	0.00		0.00	713.47	
Front End Loader Mobilization	1.00	EA	324	389	0	0	0	0	713	
			81.01	97.36	0.00	0.00		0.00	178.37	
RSM 015436500020 Mobilization or demobilization, dozer, loader, backhoe or excavator, 70 H.P. to 150 H.P., up to 50 miles	4.00	EA	324	389	0	0	0	0	713	
(Note: The less expensive option for mobilization of the front end loader is to perform 2 mobilizations and 2 demobilizations rather than pay the rental fee over the winter break in construction activity from January to April 2016. Quantity is 4 to cover 2 mobilizations and 2 demobilizations.)										
			12,316.84	7,383.50	0.00	0.00		0.00	19,700.34	
Crane Mobilization	1.00	EA	12,317	7,384	0	0	0	0	19,700	
			8,633.30	5,719.40	0.00	0.00		0.00	14,352.69	
Assembly Crew for Cranes	1.00	EA	8,633	5,719	0	0	0	0	14,353	
(Note: Less expensive option for cranes is to mobilize/demobilize each of the two cranes twice rather than rent both cranes over the winter break in construction activity. Assume 1, 10-hour day per crane per mobilization or demobilization for a total of 80 hours for the assembly crew (2 cranes x 4 mob/demob trips/crane x 10 hours/mob/demob trip).)										
			107.92	71.49	0.00	0.00		0.00	179.41	
RSM A3G A3G	80.00	HR	8,633	5,719	0	0	0	0	14,353	
			2,302.21	1,525.17	0.00	0.00		0.00	3,827.38	
150-ton Crawler Crane Mobilization	1.00	EA	2,302	1,525	0	0	0	0	3,827	

Description	Quantity	UOM	DirectLabor	DirectEQ	DirectMatl	DirectSubBid	DirectUserCost	DirectShip	DirectCost	C/O
RSM 015436502300 Mobilization or demobilization, crane, crawler-mounted, over 75 ton	4.00	EA	575.55 2,302	381.29 1,525	0.00 0	0.00 0	0	0.00 0	956.85 3,827	
(Note: The less expensive mobilization option is to perform 2 mobilizations and 2 demobilizations of the crane rather than pay the rental fee over the 4 month break in construction activity from January 2016 to April 2016. Quantity is 4 to cover 2 mobilizations and 2 demobilizations.)										
100-ton Wheeled Crane Mobilization	1.00	EA	1,381	139	0	0	0	0	1,520	
RSM 015436502100 Mobilization or demobilization, crane, truck-mounted, over 75 ton	4.00	EA	345.33 1,381	34.73 139	0.00 0	0.00 0	0	0.00 0	380.07 1,520	
(Note: The less expensive mobilization option is to perform 2 mobilizations and 2 demobilizations of the crane rather than pay the rental fee over the 4 month break in construction activity from January 2016 to April 2016. Quantity is 4 to cover 2 mobilizations and 2 demobilizations.)										